GINGIVAL RECESSION; OCCURRENCE, SEVERITY AND ASSOCIATED FACTORS AMONG PATIENTS ATTENDING DENTAL CLINICS IN DAR ES SALAAM, TANZANIA.

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By

Majuto Shaaban Mlawa

A Dissertation Submitted in (partial) Fulfilment of the Requirements for the Degree of Master of Dentistry (Restorative Dentistry) of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled **Gingival Recession; Occurrence, Severity and Associated Factors among Patients Attending Dental Clinics in Dar Es Salaam, Tanzania,** in (partial) fulfilment of the requirements for the degree of Master of Dentistry (Restorative Dentistry) of Muhimbili University of Health and Allied Sciences.

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Prof. Bakari S. Lembariti

(Supervisor)

Date: _____

DECLARATION

AND

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I, **Majuto Shaaban Mlawa**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature……. Date……..

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DEDICATION

This dissertation work is affectionately dedicated to my family, in particular to my dear wife Kibua Amani Kakolwa.

Thank you for your unconditional patience, love and devotion to me and the whole family.

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ABSTRACT

Background

Gingival recession refers to the vertical shift of the gingival margin from the crown of the tooth leading to the exposure of the root of the tooth, measured from the cementoenamel junction (CEJ) apically to where the gingival margin is at its maximum height. Gingival recession is a multifactorial problem arising mainly from periodontal diseases and mechanical factors of tooth brushing.

Gingival recession is becoming a more prominent condition in different populations and it is becoming a big problem globally. It is a common problem in adults and adolescents.

Its prevalence varies from 3% to 100% depending on the type of study, study population and methods used for analysis. In Tanzania few studies conducted on gingival recession have shown that the recession is evident among populations.

Gingival recession interferes with dental aesthetic appearance. This aesthetic problem is more embarrassing in females than in males. Not only is it causing aesthetic problem but also lead to dentine hypersensitivity and increased susceptibility for root caries.

Gingival recession is a preventable oral problem that if treated can drastically reduce discomfort and cost of treatment. This can be achieved by providing interventions to people/community based on the cause and associated factors that lead to the development of gingival recession.

Aim

The aim of this study was to determine the prevalence of gingival recession, its severity and associated factors among patients attending dental clinics at Muhimbili National Hospital and Temeke Municipal Hospital in Dar es Salaam region.

Methodology

This was a hospital based cross sectional descriptive study conducted in the dental clinics at Muhimbili National Hospital and Temeke Municipal Hospital between July and November 2012.

A sample of 339 subjects, 168 male and 171 female subjects, aged 18 years and above were interviewed using a self administered questionnaire on oral hygiene behaviour, knowledge of cause and symptoms of periodontal disease.

This was followed by full mouth examination to assess the presence of gingival recession in mm, presence or absence of gingival bleeding on gentle probing, plaque, calculus and periodontal pocket depth in mm at six points for each tooth.

Data analysis was done by using SPSS version 16.0 and the statistical level of significance was p value < 0.05.

Results

The overall prevalence of the gingival recession ≥1mm was 63.1%, the gingival recession was significantly higher in male (70.8%) than in female subjects (55.6%) (p value 0.004). The gingival recession of ≥3mm tends to increase with age (1.6% of the subjects in 18 – 34 years age group had recession of ≥3mm as compared to the 11.8% of the subjects in 65 + years age group). The lower jaw had more sites with gingival recession (61.1% of the subjects) as compared to the upper jaw (22.4% of the subjects). The buccal surfaces were more affected by the recession than the lingual/palatal surfaces (61.1% subjects were found to have gingival recession on the buccal surface and 48.7% subjects had gingival recession on the lingual/palatal surface). Age and periodontal diseases were found to be the significant contributors to the development of the gingival recession.

The tooth cleaning device and toothbrushing techniques were not significantly associated with the gingival recession.

Conclusion

This study has shown that gingival recession is prevalent among sampled population in Dar es Salaam. However, this problem does not seem to be very severe (the magnitude is generally <3mm). In this study population, gingival recession was significantly associated with age, gender and periodontal conditions (gingival bleeding, dental plaque calculus and periodontal pocket depth). Oral hygiene behaviour/practices (toothbrushing techniques) did not show association with recession of the gum.

Recommendation

Effort should be made to increase awareness to the population, dental professionals and peer groups on gingival recession. Individuals/communities should be advised to visit dental clinics for check up and treatment if gingival recession is experienced.

Improvement should be made in technical know - how to manage the gingival recession, availability of equipments and funding to deal with the gingival recession problem.

Government should establish policies that will empower the individuals/communities and dental professionals in the prevention and treatment of gingival recession.

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ABBBREVIATIONS

AIDS	-	Acquired Immunodeficiency Syndrome.
CEJ	-	Cemento-enamel junction.
CPI	-	Community Periodontal Index.
DDS	-	Doctor of Dental Surgery.
DSM	-	Dar es Salaam.
GR	-	Gingival recession.
HIV	-	Human Immunodeficiency Virus.
MDENT	-	Master of Dentistry.
mm	-	Millimetre.
MNH	-	Muhimbili National Hospital.
MoHSW	-	Ministry of Health and Social Welfare.
MUHAS	-	Muhimbili University of Health and Allied Sciences.
RD	-	Restorative Dentistry.
TMH	-	Temeke Municipal Hospital.

INTRODUCTION AND LITERATURE REVIEW

Oral diseases are not normally life-threatening, but they can create a large burden to an individual or population at large. Dental problems have been positioned as the fourth most frequent illness (Spencer AJ and Lewis JM 1988) with caries being the highest-ranked diet-related disease (Crowley et al.1992), and periodontal disease the fifth most prevalent health condition (AIHW, 2000). Periodontal diseases involve periodontal tissue inflammation that can be associated with gingival recession.

Periodontal diseases start to develop as periodontal inflammation and lead to the breakdown of connective tissues. With time, there is proliferation of epithelial tissue resulting in development of the gingival recession (Baker DL and Seymour GJ 1976).

Gingival recession refers to the vertical shift of the gingival margin from the crown of the tooth/teeth leading to the exposure of the root(s) of the tooth/teeth. Gingival recession may be generalized to an entire arch or area or localized to a single tooth.

According to the International Workshop on Classification of Periodontal Diseases and Conditions held in USA from October 30th – November 2nd, 1999, gingival recessions are classified in the group of Development or Acquired Mucogingival Deformities and Conditions around teeth and are explained as the displacement of the marginal tissue apical to the cemento-enamel junction (Ann Periodontol, 1999).

Gingival recession is increasingly becoming a more prominent condition in the oral health of different populations and it is becoming a big problem nowadays. It's a common occurrence and its prevalence increases with age, (Serino G et al.1994, Khocht A et al.1993, Hosanguan C et al.2002, Almeida AL et al.2007), amount of dental plaque and calculus (Toker H and Ozdemir H, 2009, Goutoudi P et al.1997) and improper practicing oral hygiene methods (Joshipura KJ et al.1994).

Gingival recession in its localized or generalized form is an undesirable condition caused by root exposure that interferes with the aesthetic appearance (Kassab MM and Cohen RE, 2003, Slutzkey S and Levin L, 2008),

dentin hypersensitivity, increased susceptibility for root caries (Albandar JM and Kingman A, 1999, Slutzkey S and Levin L, 2008, Kassab MM and Cohen RE, 2003), cervical root abrasions, difficult plaque control, diminished cosmetic appeal and aesthetic concern.

Marginal gingival recession, therefore, can cause major functional and aesthetic problems and should not be viewed as merely a soft tissue defect, but rather as the destruction of both the soft and hard tissues as it occurs in association with resorption of alveolar and supporting bone in periodontal diseases in particular. This aesthetic problem is more embarrassing in females as compared to males. Gingival recession can sometimes make both females and males loose self confidence when talking in front of peer groups.

Gingival recession is a common problem affecting all races, age groups and sexes. It is a result of more than one factor including periodontal diseases and mechanical factors of tooth brushing acting together (Chrysanthakopoulos NA, 2011, Rajapakse PS et al.2007, Toker H and Ozdemir H, 2009, Mumghamba EGS et al.2009). It manifests in both adults and adolescent and teenagers (Sote EO, 1991, Akpata ES and Jackson D, 1979, van Palenstein Helderman WH et al.1998, Ainamo J et al.1986). It has been reported that approximately 80% of the young individuals in Belgaum district, India, have gingival recession of about 1.0 millimeter or more (Dodwad V, 2001).

The prevalence of gingival recession has been reported to vary from 3% to 100% depending on the type of study, study population and methods used for analysis (Lintonjua LA et al; 2003). A prevalence of about 90% has been described in older people who have been institutionalized (Banting DW et al.1980). A gingival recession prevalence of more than 50% has been reported in one or more sites in the US (Kassab MM and Cohen RE, 2003). In France, 84.6% of the study population had at least one site /tooth with gingival recession, (Sarfati A et al.2010). In Turkey, a study aimed at evaluating prevalence of GR indicated that the prevalence of GR among adults attending university dental hospital was about 78.2% (Toker H and Ozdemir H, 2009). The prevalence of gingival recession in a young adult Israeli population was 14.6% of the study subjects (Slutzkey S and Levin L. 2008).

Gingival recession has also been studied in some African populations. In Nigeria, the occurence of gingival recession has been reported among teenagers, testistfying that gingival recession is not only a problem of the adult and old populations (Sote EO, 1991, Arowojolu MO, 2000, Akpata ES and Jackson D, 1979). In Ivory Coast, Coulibaly et al. reported the occurence of gingival recession among the students of Abidjan University (Coulibaly NT et al.2002).

Other studies conducted in other parts of Africa have shown the same trends. A study done in Morocco, Northern Africa, by Bouziane et al has shown the occurance of gingival recession among Moroccan population (Bouziane A et al.2008). Studies conducted in South Africa have also shown the occurence of the gingival recession on average between 17.56% (Ebrahim R and Naidoo S, 2008) and 100% (Louw AJ et al.1993) among different study populations.

Studies on teeth mostly affected by gingival recession have shown that the mandibular central incisors (Akpata ES and Jackson D, 1979, and Dodwad V, 2001) and maxillary cuspids and first premolars (Gorman WJ, 1967) as being most affected by localized gingival recession. Also the buccal surfaces of the teeth are mostly affected by the gingival recession (Löe H et al.1992). Studies done in New Zealand (Thomson WM et al.2000) and Espoo, Finland (Ainamo J et al.1986) have also reported similar findings.

The factors associated with gingival recession are not fully understood. However, there are several associated factors that have been found to correlate/relate to gingival recession and may be responsible for its occurrence (Addy M and Hunter ML, 2003). It has been proposed that gingival recession is a multifactorial problem, with one type being associated with anatomical factors and another with physiological or pathological factors (Kassab MM and Cohen RE, 2003).

The factors associated with gingival recession range from periodontal diseases to mechanical factors of tooth brushing (O'Leary TJ et al.1968, Serino G et al.1994, Löe H et al.1992).

Gingival recession secondary to periodontal diseases may be associated with poor oral hygiene (Mumghamba EGS et al.2009, Gorman WG, 1967).

Periodontal treatment including scaling and root planing may be associated with some degree of gingival recession (Lindhe J et al.1987).

Gingival rcession due to the mechanical factors of tooth brushing may be associated with forceful brushing (Joshipura KJ et al.1994), frequent brushing (Khocht A et al.1993, Sangnes G and Gjermo P, 1976) as well as hard tooth brush filaments (Khocht A et al.1993).

Gingival recession can also occur among people/population with a high standard of oral hygiene (Serino G et al.1994). Other factors may include local irritants including plaque and calculus, iatrogenic restorations, mechanical trauma including biting habits, iatrogenic restorations and associated high frenum attachments.

Encouraged by a greater understanding of the dynamics of healing along with an increased awareness of aesthetics on the part of the public and profession over the last two decades, various periodontal procedures have been introduced to deal with the problems of gingival recession. Knowledge has increased regarding the incidence and prevalence, aetiology, prevention and treatment of gingival recession. Treatment suggestions for gingival recession defects have been developed based on the knowledge for healing the gingiva and the attachment system. Proper home care procedures which include avoiding over brushing any area predisposed to recession will, in many cases, prevent its occurrence. This includes the use of soft and medium fillamented toothbrushes and less abrasive toothpaste. Proper restorations placed supragingival where possibly with proper gingival contour can prevent iatrogenic recession and surgical techniques to cover the exposed root surfaces. Thorough removal of local irritants and control of harmful soft tissue trauma, (nail and pencil biting) can help control recession.

The health care services in the African continent are generally not adequately provided. This may have been contributed by different factors including inadequate number of qualified health personnel, inadequate supply of medical equipment and materials and other appropriate facilities and systems for health care service provision (hospitals, health centres and dispensaries). In these situations the existing health problems become amplified and result in big burden to the people in Africa.

African scholars, health personnel in particular, therefore have a big role to play in alleviating the problems. Initiatives should include doing researches which may lead to solutions to solve/reduce if not eradicate the problems facing populations.

Information about the occurrence, severity and factors associated with the gingival recession in Tanzanian populations is scarce.

So far only a few studies have been conducted on gingival recession, therefore, the aim of this study was to assess the prevalence of gingival recession, its severity and also to find out associated factors with the occurrence of gingival recession in patients attending dental clinics in Muhimbili National Hospital and Temeke Municipal Hospital.

PROBLEM STATEMENT

Gingival recession is becoming a big problem globally. It is a common problem in both adults and adolescents.

Gingival recession can result in root exposure, thus causing dentine hypersensitivity and increased susceptibility for root caries.

Different reports have shown variations in magnitude, associated factors and remedial actions to gingival recession.

The gingival recession in the Tanzanian population has not been extensively studied. This study was therefore conducted in Dar es Salaam Region to give a description of the gingival recession and identify factors associated with its occurrence and development in sampled populations.

The conduction of the study is beneficial because it has disclosed the magnitude of the gingival recession problem in the community, assessed its severity and factors associated with it and level of knowledge among the population on the gingival recession. The study was also aimed at coming up with results and possible solutions on how the gingival recession problem can be prevented.

RATIONALE / JUSTIFICATION

Gingival recession is a preventable oral problem that if treated can drastically reduce discomfort and cost of treatment. This can be achieved by providing interventions to community based on the cause and associated factors that lead to the development of gingival recession. The community can also be sensitized to be aware of the problem and thus, change their attitudes and practices towards the oral health promotions. However, prevention can only be considered after the problem has been identified and assessed.

The results of this study were intended to disclose the magnitude of the gingival recession.

This information is needed in planning strategies for treating gingival recession, raising public awareness on the different factors associated with its development and in preventing resulting oral health problems, sensitivity, pain and susceptibility for root caries.

The results of the study can serve as baseline information for the Ministry of Health and Social Welfare in developing strategic plans of preventing progression of the gingival recession and its outcomes in the Tanzanian population.

This study is also part of the author's training towards the partial fulfilment of the Master of Dentistry (MDENT) degree program of the Muhimbili University of Health and Allied Sciences.

OBJECTIVES

BROAD OBJECTIVE

To determine the prevalence of gingival recession, its severity and associated factors among patients attending dental clinics in Dar es Salaam, Tanzania.

SPECIFIC OBJECTIVES

1. To determine the prevalence of gingival recession by socio-demographic factors among patients attending Muhimbili National Hospital and Temeke dental clinics.
2. To determine the prevalence of gingival recession by mostly affected tooth surface and jaw.
3. To determine the association between types of tooth cleaning device and gingival recession.
4. To determine the association between tooth brushing technique and gingival recession.
5. To determine the association between frequency of tooth brushing and gingival recession.
6. To determine the association between gingival bleeding, plaque & calculus and gingival recession.
7. To determine the association between periodontal pocket depth and gingival recession.

METHODOLOGY

Study area and study design

This was a hospital based cross sectional descriptive study comprising of a self administered questionnaire and a clinical examination. It was conducted at the dental clinics in the Muhimbili National Hospital (teaching hospital for the Muhimbili University of Health and Allied Sciences) and Temeke Municipal Hospital.

These two hospitals were purposely chosen because they attend patients representing urban and semi - urban populations (MNH and TMH respectively). Both MNH and TMH are government hospitals that serve populations of different background, education and economic abilities.

Study population

The study population included a sample of patients, ranging from 18 years old and above who attended the dental clinics at Muhimbili National Hospital and Temeke Municipal Hospital, in July through November, 2012.

Sample size and sampling technique

A convenient sample of 339 patients, (168 males and 171 females) who attended the dental clinics was obtained during the study period.

The sample size was calculated according to the following formula:

$$n = \frac{Z^2 P(1-P)}{e^2}$$

Where;

n = Sample size.

Z = Standard normal deviation, set at 95% (1.96).

P = Proportion in the population estimated to have gingival recession 0.34.

e = Level of accuracy/precision, set at 5% (0.05).

According to the formula a sample size of 339 subjects was identified.

The recruitment of the study population was based on the following inclusion and exclusion criteria.

Inclusion criteria

Patients aged 18 years old and above who attended the dental clinic during the study period.

Exclusion Criteria

1. Mentally incapable patients.
2. Patients with oral tumours/cancers.
3. Patients who had been brought to dental clinic as emergency after sustaining facial injury.

Ethical Issues

Ethical clearance was requested from the Ethical Clearance Committee of the Muhimbili University of Health and Allied Sciences.

Refusal to participate in the study did not involve penalties to the patients.

Advice and referral to the respective dental unit for treatment was done after the interviews.

These patients were allowed to proceed with treatment as per routine hospital procedures. Participants were given option to stop participation in the study at any time without repercussions.

Data collection

The data collection, both from the questionnaire and clinical examination, was done by the investigator with assistance of trained recorders from the respective clinics who were trained on how to enter the score in the clinical examination form.

Data collection started after the University authorities and administration of Muhimbili Dental clinic and Temeke Municipal Hospital had given permission.

Questionnaire

A designed self administered questionnaire that gathered information concerning socio – demographic data (age, gender and education), tooth cleaning device used during tooth brushing, technique of tooth brushing and frequency of tooth brushing was filled by all participants in a specified location adjacent to the dental treatment room in the respective hospital/clinic.

Those who had difficulties to comprehend, read and write were assisted by the researcher.

Clinical examination

Examination for gingival recession, gingival bleeding, dental plaque, calculus and periodontal pocket depths was done on all teeth in the mouth except third (3^{rd}) molars. This is because of the distal location that made measurement difficult.

With the patient seated in a dental chair with overhead light, the assessment was done and recorded on a clinical data record form according to the following scoring criteria:

Gingival recession was scored in mm by measuring the distance from the CEJ apically to where the gingival margin is at its maximum height with the exposure of tooth surfaces. The score was done in the closest whole mm using the Williams periodontal probe calibrated at 1mm interval.

The teeth were divided into six (6) measuring points/surfaces, 3 points on the buccal surfaces (distobuccal, midbuccal and mesiobuccal) and 3 points on the lingual/palatal surfaces (distolingual/palatal, midlingual/palatal and mesiolingual/palatal).

In cases where cementoenamel junction was covered by calculus, the calculus was first removed prior to the identification of the cementoenamel junction.

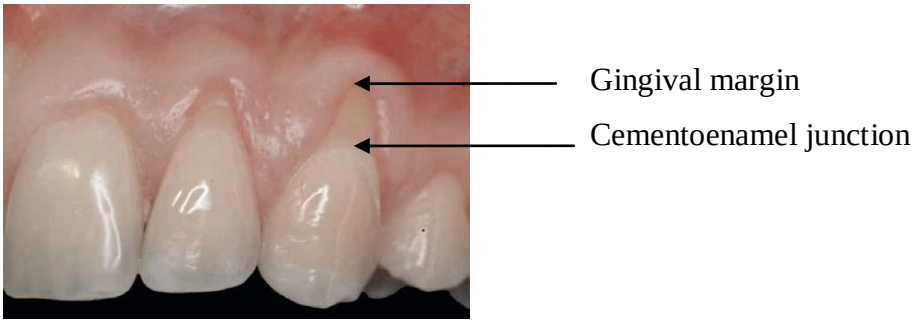

Figure 1:

Measurement of gingival recession as a distance from the cementoenamel junction to where the gingival margin is at its maximum height with the exposure of root surfaces.

Periodontal pocket depth was scored in mm by measuring the distance from the gingival margin to the bottom of the pocket using the Community Periodontal Index (CPI) probe on all six measuring surfaces.

Score was as follows:

Score 0 = < 3.5mm.

Score 1 = 3.5 – 5.5mm.

Score 2 = >5.5mm.

Dichotomous scoring (absent or present) was done for the following parameters:

1. Gingival bleeding on gentle probing scored as 0 = absent, 1 = present on each measuring surface. The score was done 10 seconds after gentle probing using CPI probe on all six measuring surfaces.
2. Dental plaque scored as 0 = absent, 1 = present on each measuring surface using the Williams periodontal probe.
3. Calculus scored as 0 = absent, 1 = present on each measuring surface using the CPI probe.

Data management and data analysis

Recorded data was coded and entered in a data file in a computer and data cleaning was done, analysis was done using Statistical Package for Social Sciences (SPSS) version 16.0.

Descriptive frequency was run to see the distribution of socio – demographic status. Cross tabulation was run to get the proportion of gingival recession. The Chi-square test was used to analyse the difference between different variables at a statistical significance value of $p < 0.05$ for two groups in order to find out the statistical significance among them and also correlation and regression was done to see whether there was any association between groups.

T-Test was used to see whether there was statistical significance between more than two groups.

Cross tabulation was done to get the prevalence and correlation and regression were used to determine whether there was association between frequency of tooth brushing, tooth brushing technique, gingival bleeding, dental plaque, calculus and periodontal pocket depth and gingival recession.

The cut off point level of statistical significance was set at $p < 0.05$.

RESULTS

Distribution of the study population was almost similar in two clinics – 168 males (91 from MNH and 77 from TMH) and 171 females (92 from MNH and 79 from TMH). Majority of the participants were in the 18 – 34 age group (54%). Majority of the participants had secondary school education, (Table 1).

Table 1:

Distribution of study participants by socio - demographic factors

Socio – demographic factors	**Frequency (n)**	**Percentage (%)**
Gender		
Male	168	49.6
Female	171	50.4
Age groups (in years)		
18 – 34	183	54.0
35 – 44	46	13.6
45 – 64	93	27.4
65 +	17	5.0
Education level		
None	4	1.0
Primary	75	22.0
Secondary	210	62.0
College/University	50	15.0

Majority, 56.8% of those aged 18 – 34 years, had no gingival recession and only 9.8% had gingival recession of 2mm and above. As the age increased, the majority had gingival recession of 1mm or more and these were mostly found in the 35 – 44 age group.

Very few subjects (11.8%) mostly in the older age groups (65 years and above) had gingival recession of ≥3mm. In general, females had less gingival recession as compared to males.

Urban (MNH) subjects had less gingival recession than semi – urban (TMH). The prevalence of gingival recession experienced was mostly around 1mm, (Table 2).

Table 2:

Prevalence of gingival recession according to socio – demographic factors

Socio-demographic factor	**Gingival recession prevalence**				***p* - value**
	0mm	**1mm**	**2mm**	**≥3mm**	
Age group (in years)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
18 – 34	104 (56.8)	61 (33.4)	15 (8.2)	3 (1.6)	0.001
35 – 44	12 (26.0)	25 (54.4)	7 (15.2)	2 (4.4)	
45 – 64	9 (9.7)	49 (52.7)	27 (29.0)	8 (8.6)	
65 +	0 (0)	8 (47.0)	7 (41.2)	2 (11.8)	
Gender					
Male	49 (29.2)	76 (45.2)	33 (19.6)	10 (6)	0.03
Female	76 (44.5)	63 (36.8)	26 (15.2)	6 (3.5)	
Education level					
None	1 (25)	0 (0)	2 (50)	1 (25)	0.022
Primary	17 (22.7)	37 (49.3)	17 (22.7)	4 (5.3)	
Secondary	90 (42.9)	83 (39.5)	26 (12.4)	11 (5.2)	
College/University	17 (34)	22 (44.0)	9 (18)	2 (4)	
Location of clinic					
Temeke (semi - urban)	47 (30.1)	72 (46.2)	29 (18.6)	8 (5.1)	0.017
Muhimbili (urban)	78 (42.6)	66 (36.1)	30 (16.4)	9 (4.9)	

The gingival recession prevalence was found to be greater in lower jaw as compared to the upper jaw and mostly 1mm and tends to decrease as gingival recession increases.
With respect to tooth surface, buccal surfaces had more gingival recession, (Table 3).

Table 3:

Prevalence of gingival recession according to jaw and tooth surface

Jaw	**Gingival recession prevalence**			
	0mm	**1mm**	**2mm**	**≥3mm**
	n (%)	**n (%)**	**n (%)**	**n (%)**
Upper jaw	263 (77.6)	58 (17.1)	14 (4.1)	4 (1.2)
Lower jaw	132 (38.9)	121 (35.7)	65 (19.2)	21 (6.2)
Tooth surface				
Buccal	132 (38.9)	132 (38.9)	58 (17.1)	17 (5.1)
Lingual/Palatal	174 (51.3)	107 (31.6)	42 (12.4)	16 (4.7)

The teeth mostly affected with recession were the lower anteriors (from 33 - 43) and buccal surfaces were mostly affected, (Table 4).

Table 4:
Prevalence of gingival recession according to tooth and surfaces

Tooth number	Number of teeth present	Number of teeth with gingival recession (in mm)																
		Distobuccal surface			Midbuccal surface			Mesiobuccal surface			Distopalatal/lingual surface			Midpalatal/lingual surface			Mesiopalatal/lingual surface		
		1mm	2mm	≥3mm	1mm	2mm	≥3mm	1mm	2mm	≥3mm	1mm	2mm	≥3mm	1mm	2mm	≥3mm	1mm	2mm	≥3mm
17	283	70	12	5	71	12	6	72	12	5	63	7	6	63	8	5	61	7	7
16	309	64	20	7	68	21	8	68	23	6	60	16	5	52	16	7	49	15	7
15	313	61	7	2	48	15	3	40	13	4	30	10	1	16	18	2	25	9	2
14	330	41	11	2	45	10	3	45	10	3	27	9	2	25	8	1	25	7	2
13	337	33	7	4	32	5	5	31	6	5	23	6	2	23	5	3	23	6	2
12	332	17	4	3	16	2	4	16	2	4	14	5	1	14	5	1	14	5	1
11	310	15	2	2	14	1	3	14	2	2	13	3	1	12	3	1	12	2	2
21	317	13	3	3	13	3	3	13	4	2	12	4	2	12	4	2	12	4	2
22	333	13	4	2	13	3	3	13	3	3	10	3	3	10	4	2	10	4	2
23	339	34	10	1	36	10	1	36	10	1	20	9	1	20	9	1	20	9	1
24	334	37	11	2	43	11	2	43	11	2	28	10	0	28	10	0	28	10	0
25	324	41	10	1	41	10	1	41	10	1	26	8	0	26	8	0	30	8	0
26	326	52	14	2	47	17	5	51	11	5	33	15	1	37	15	1	37	15	1
27	315	57	5	1	55	6	2	52	5	1	39	4	2	37	4	3	38	6	0
37	310	44	5	1	38	11	1	39	9	1	41	7	0	41	6	0	41	6	0
36	291	35	11	0	34	11	0	36	11	0	31	5	0	32	4	0	34	4	0
35	323	48	11	0	55	10	1	55	10	1	59	8	1	58	9	1	56	9	1
34	337	78	14	2	74	19	2	83	14	1	80	13	2	82	18	3	83	19	2
33	337	93	49	11	87	52	16	94	49	14	101	38	13	99	37	12	97	43	8
32	333	119	66	13	110	66	22	116	66	16	120	61	16	112	62	23	110	70	17
31	325	89	75	25	85	75	29	92	72	25	108	60	27	96	74	25	104	72	19
41	329	93	76	24	90	72	31	90	71	32	98	69	32	88	79	32	96	75	28
42	335	99	77	19	89	79	24	96	77	20	98	74	19	94	80	19	103	76	14
43	335	86	64	21	78	68	23	83	61	21	86	55	7	86	52	10	91	51	10
44	339	74	39	4	65	45	5	70	39	6	77	23	2	79	19	4	82	14	3
45	320	50	17	5	49	17	5	49	17	5	49	11	5	49	11	5	43	11	5
46	290	32	15	5	37	14	5	36	16	4	39	9	3	39	9	3	33	9	3
47	300	41	14	3	41	13	4	39	14	3	40	12	4	38	13	3	38	13	3

Concerning the tooth cleaning device that was used during the tooth brushing, all the subjects reported to use plastic tooth brush.

No statistical significant difference was found among the three tooth brushing techniques in respect to gingival recession (p = 0.171). This may be due to the skewedness of the study population with respect to tooth brushing techniques (only three subjects used circular technique) as shown in Table 5.

Table 5:

Prevalence of gingival recession according to brushing technique using a plastic tooth brush

Practice	**Gingival recession prevalence**				***p* - value**
	0mm	**1mm**	**2mm**	**≥3mm**	
Tooth brushing technique	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Horizontal	101 (35.7)	123 (43.5)	46 (16.2)	13 (4.6)	0.171
Vertical	24 (45.3)	13 (24.5)	12 (22.6)	4 (7.6)	
Circular	0 (0)	1 (33.3)	0 (0)	2 (66.7)	

There was statistical significant difference between the frequencies of tooth brushing and gingival recession (p = 0.001). Those who brush twice a day had greater gingival recession (≥3mm) as compared to the other groups. Only one subject reported brushing three times a day as shown in Table 6.

Table 6:

Prevalence of gingival recession according to frequency of tooth brushing

Practice	**Gingival recession prevalence**				***p* - value**
	0mm	**1mm**	**2mm**	**≥3mm**	
Frequency of tooth brushing	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Once a day	58 (26.8)	103 (47.7)	43 (19.9)	12 (5.6)	0.001
Twice a day	67 (54.9)	18 (14.8)	10 (8.2)	27 (22.1)	
Three times a day	0 (0)	1 (100)	0 (0)	0 (0)	

There was statistical significant difference between gingival recession and gingival bleeding, dental plaque, calculus and periodontal pocket depth.

It was further observed that the gingival recession of ≥3mm increases with the increase of periodontal pocket depth, (Table 7).

Table 7:

Prevalence of gingival recession according to periodontal conditions - gingival bleeding, plaque, calculus and periodontal pocket depth

Periodontal condition	**Gingival recession prevalence**				**P - value**
	0mm	**1mm**	**2mm**	**≥3mm**	
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Gingival bleeding	77 (32.5)	109 (46.0)	39 (16.5)	12 (5.0)	0.011
Plaque	73 (27.1)	129 (48.0)	52 (19.3)	15 (5.6)	0.001
Calculus	17 (8.1)	125 (59.2)	54 (25.6)	15 (7.1)	0.001
Periodontal pocket depth					
<3.5mm	123 (41.1)	122 (40.8)	43 (14.4)	11 (3.7)	0.001
3.5-5.5mm	2 (6.6)	17 (56.7)	8 (26.7)	3 (10)	
>5.5mm	0 (0)	2 (20)	6 (60)	2 (20)	

There was an association between the frequency of tooth brushing and development of gingival recession, but tooth brushing technique showed no association, (Table 8).

Table 8:

Correlation and Regression showing oral hygiene practice and development of gingival recession

Practice	Bivariate (unadjusted)			Multivariate (adjusted)		
	OR	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
Frequency of tooth brushing	3.3	2.0-5.2	0.00	**3.2**	2.0-5.1	**0.00**
Tooth brushing technique	1.5	0.8-2.7	0.16	**1.4**	0.7-2.7	**0.23**

There was an association between gingival recession and periodontal conditions, (gingival bleeding, dental plaque, calculus and periodontal pocket depth).

It was further observed that gingival bleeding and periodontal pocket (in absence of other factors), showed an association with development of gingival recession, (p – value 0.01 and 0.00 respectively). However when other factors were present, they didn't seem to show association with the development of gingival recession, (p – value 0.07 and 0.08 respectively), as shown in Table 9.

Table 9:

Correlation and Regression showing periodontal condition and development of gingival recession

Periodontal condition	**Bivariate (unadjusted)**			**Multivariate (adjusted)**		
	OR	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
Gingival bleeding	1.8	1.1-2.9	0.01	**2.8**	0.9-9.1	**0.07**
Dental plaque	7.7	4.2-14	0.00	**5.1**	1.4-18.2	**0.01**
Dental calculus	61.6	30-122	0.00	**4.2**	20.6-86.4	**0.00**
Periodontal pocket depth	13.2	3.1-56	0.00	**4.7**	0.8-27.1	**0.08**

DISCUSSION

The problem was observed mostly at the level of 1mm. Very few participants had gingival recession of ≥3mm.

Among those with gingival recession, male subjects seemed to have more gingival recession when compared with females (70.8% and 55.6% respectively). This difference was statistically significant (p – value 0.03). These findings are in agreement with results from other studies that indicated higher prevalence of gingival recession in males as compared to females in Turkey (Toker H and Ozdemir H, 2009). Other studies (Dodwad V, 2001, Stoner EJ, Simon M, 1980, Khocht A et al.1993) have also shown similar findings. This can be explained by the fact that females are easily motivated and grasp information better than males. Females are also more easily to accept changes in oral habits and this may lead to better oral hygiene. It was also learnt that the male participants in the study use more force in brushing. The brushing with much force may have contributed to the increased gingival recession among males.

The occurrence of gingival recession tends to increase with age. As one ages, the chance to develop gingival recession increases. Similar findings were reported by van Palenstein Helderman WH et al.1998, Serino G et al.1994, Khocht A et al.1993, Hosanguan C et al.2002 and Almeida AL et al.2007. In this study, as the age approached 60 years, the prevalence of gingival recession ≥1mm was more than 90%. These results seem to confirm the results reported by Banting DW et al.1980 and Toker H and Ozdemir H, 2009 which showed higher prevalences of gingival recession among the older people. This may be attributed by cumulative effects of the disease progression over a period of time, rather than being a consequence of the ageing process.

Gingival recession was also found among adolescents and young individuals/adults. This may be due to frequent brushing and the use of hard fillamented tooth brush, resulting to the trauma of gingival tissue and therefore increase the chance to develop gingival recession at younger age. These results concur with the results from studies done in Nigeria (Sote EO, 1991, Arowojolu MO, 2000, Akpata ES and Jackson D, 1979), Israel (Slutzkey S and Levin L, 2008) and in Belgaum district, India (Dodwad V, 2001).

The observed prevalence of gingival recession was mostly found in the lower jaw than in upper jaw. This may be due to rapid formation of plaque and calculus in the lower jaw than in the upper jaw. These are also sites that have normally more dental plaque and calculus deposits - indicating strong relationship between occurrence of gingival recession and dental plaque/calculus. These results are in agreement with studies which have been done in Tanzania (van Palenstein Helderman WH et al.1998, Mumghamba, EGS et al.2009), Turkey (Toker H and Ozdemir H, 2009) and Brazil (Milena Guerreiro Marini et al.2004).

The mandibular anterior teeth (central and lateral incisors) were the most commonly affected teeth with the gingival recession. These findings are in agreement with the studies done in Nigeria (Akpata ES and Jackson D, 1979), Finland (Miira Vehkalahti, 1989), Brazil (Milena Guerreiro Marini et al.2004) and in India (Dodwad V, 2001) which reported gingival recession to be more common in mandibular anterior teeth.

In this study population, the buccal surfaces of the teeth were found to be mostly affected by the gingival recession. This might be due to the fact that majority of people tend to brush the buccal surfaces of the teeth. This practise exposes the buccal surfaces to the trauma of the brushing action and therefore increases the chance to develop gingival recession. Similar results were reported by other studies done in Norway and Sri Lanka (Löe H et al.1992), New Zealand (Thomson WM et al.2000) and Espoo, Finland (Ainamo J et al.1986).

All participants reported using the plastic tooth brush. This is contrary to the belief that some groups of the population especially semi – urban location use other tooth brushing aids (chewing sticks). This observation may have been confounded by the fact that the study population was comprised of patients who attended the dental clinics for treatment. Studies involving wider community groups should be considered so as to have a more representative sample.

The observed lack of association between brushing technique and gingival recession may have been contributed by the fact that there was a skewedness of study population with regard to brushing technique. Only three (3) subjects out of 339 reported to have used a circular motion, the majority reported to have used horizontal motion and vertical motion.

This finding is in agreement with the study done in Tanzania (Mumghamba, EGS et al.2009).

The observed association between gingival recession of ≥3mm and frequency of tooth brushing can be explained by the mechanical outcomes of the brushing on the gingival tissue. This is especially pronounced in our case where hard fillamented tooth brushes are commonly used simply because they are cheaper and more readily available in the market. This finding is in agreement with study done in U.S.A (Khocht A et al.1993).

The association between periodontal conditions and gingival recession found in this study are in agreement with studies done in Tanzania (van Palenstein Helderman WH et al.1998, Mumghamba EGS et al.2009), India (Dodwad V, 2001), Boston, Maryland (Joshipura KJ et al.1994) and in Brazil (Susin C et al.2004). This finding may be attributed by the fragility of the gingival tissue that result from inflammation and mechanical effects of brushing. The presence of dental plaque, calculus and apical displacement of the gingival tissue due to toxins from viable microbial plaque harboured within the calculus deposit explains the observed prevalence.

CONCLUSION

This study has shown that gingival recession exists in this sampled study population in Dar es Salaam, Tanzania.

However this problem does not seem to be very severe as the magnitude is generally <3mm.

Furthermore the study also has shown that gingival recession is a multifactorial problem basically arising from periodontal conditions/diseases (gingival bleeding, plaque, calculus and periodontal pocket depth) and mechanical factors of tooth brushing practices.

It has been shown by this study that not only does the gingival recession affect the elderly but also young individual and adolescents. Its prevalence tends to increase with age.

RECOMMENDATIONS

Based on the results of this study, the following recommendations are proposed in addressing the gingival recession problem in Tanzania:

1. Action should be taken to address the gingival recession problem by:
    - Individuals (through awareness, attendance to dental clinics for check up and treatment).
    - Communities (through awareness).
    - Dental professionals (through awareness and management).
    - Media (through creation of awareness through radio, TV programs and printed media).
    - The government (through policies, empowerment in terms of funding and facilities).
2. Further studies on gingival recession need to be done in wider community to assess the general population status.

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APPENDIX I: INFORMED CONSENT FORM (ENGLISH VERSION)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
DIRECTORATE OF RESEARCH AND PUBLICATIONS

INFORMED CONSENT FORM

ID. No. ☐☐☐ **Clinic No** ☐

Consent to Participate in the Study

Good morning! My name is Majuto Shaaban Mlawa, I am working on this research with the objective to determine the occurrence/prevalence of gingival recession, its severity and associated factors among patients attending dental clinics at Muhimbili and Temeke Municipal Hospital, in Dar es Salaam Region.

Purpose of the study

The study is conducted in partial fulfilment of the requirements for the degree of Master of Dentistry in Restorative Dentistry (MDENT. RD) of MUHAS. The study aims at determining prevalence of gingival recession and its severity, also to find out factors associated with gingival recession among patients attending dental clinics at Muhimbili and TMH, in Dar es Salaam Region. With all due respect, you are being asked to participate in this study that will facilitate the attainment of the above objectives.

Kindly be honest and true for betterment of the results that will lead to better intervention plans and recommendations for future use.

What Participation Involves

On agreeing to participate in the study, you will first be interviewed in order to answer a series of questions in the questionnaire prepared for the study. Secondly, the researcher/examiner will perform a full mouth examination and provide you with a summary of the findings and offer advice and reference for suitable treatment if necessary.

Confidentiality

All information collected on examination forms will be entered into computers with only the study identification number. Confidentiality will be observed and unauthorized persons will have no access to the data collected.

Risks

We do not expect any harm to happen to you because of your participation in this study. Some questions may make you feel uncomfortable. You might refuse/stop to continue with the interview at anytime if there is a need to drop out.

Right to Withdraw and Alternatives

Your participation in this study is completely voluntary. You can stop participating in this study at anytime, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty.

Benefits

Upon agreeing to participate in this study, you will be advised on what to do (management) with accordance to the examination findings so as to prevent further damage to your oral tissues. The information that you will provide, will help to determine prevalence of gingival recession and assess its severity, and determine factors associated with gingival recession.

The result of the study will provide information that will create awareness and knowledge on gingival recession and factors associated with it in order to reduce the problem in the population.
The results will also serve as baseline information for the Ministry of Health and Social Welfare in developing strategic plans of preventing gingival recession and its outcomes.

Who to Contact

If you have any question/worry about this study, you can contact the Principal Investigator, Majuto Shaaban Mlawa of Muhimbili University of Health and Allied Sciences, P. O. Box 65007, Dar es Salaam, mobile +255 714 519 451. If you have any question about your rights as a participant, you may contact Supervisor of this study Professor Bakari S. Lembariti, mobile +255 713 223 929 or Professor M. Aboud, Chairperson of the MUHAS Research and Publications Committee, P. O. Box 65001, Telephone : +255 22 2150302-6, Dar es Salaam.

Signature:

Do you agree?

Participant agrees …….. Participant does NOT agree …….

I, ……., have read this form and given my contents to participate in this study. My questions/worries have been cleared.

Signature of participant ……

Signature of Researcher/Assistant ……..

Date of signed consent …….

APPENDIX II: INFORMED CONSENT FORM (SWAHILI VERSION)

CHUO KIKUU CHA SAYANSI ZA AFYA MUHIMBILI
KURUGENZI YA TAFITI NA UCHAPISHAJI

FOMU YA RIDHAA

Namba ya usaili ☐☐☐ **Namba ya Kiliniki** ☐

Ridhaa ya kushiriki kwenye utafiti

Habari! Jina langu ni Majuto Shaaban Mlawa, nafanya utafiti wa kinywa wenye lengo la kutathmini ukubwa wa tatizo la kuvuka fizi na kuangalia uhusiano uliopo baina ya tatizo lenyewe na vitu vinavyopelekea kuwepo kwa tatizo hili kwa wagonjwa wanaohudhuria kliniki ya meno Muhimbili na kliniki ya meno Hospitali ya Manispaa ya Temeke zilizopo Jijini Dar es Salaam.

Dhumuni la utafiti

Utafiti huu unafanyika katika kutimiza sehemu ya matakwa ya shahada ya uzamili ya matibabu ya kurekebisha na kuziba meno ya Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili. Utafiti huu unalenga kutathmini ukubwa wa tatizo la kuvuka fizi na kuangalia uhusiano uliopo baina ya tatizo lenyewe na vitu vinavyopelekea kuwepo kwa tatizo hili kwa wagonjwa wanaohudhuria kliniki za meno Muhimbili Hospitali ya Manispaa ya Temeke zilizopo Jijini Dar es Salaam.

Unaombwa kushiriki katika utafiti huu kutokana na upeo na ufahamu ulio nao ambavyo ni muhimu kwa utafiti huu. Tafadhali kuwa muwazi na mkweli kwa vile matokeo ya utafiti huu yanaweza yakatoa maamuzi na mapendekezo ya huduma ya meno ndani ya taifa hili baadaye.

Jinsi ya kushiriki

Ukikubali kushiriki katika utafiti huu, utasailiwa kwanza ili kuweza kujibu maswali yaliyopo kwenye dodoso lililoandaliwa kwa ajili ya utafiti huu. Pili mganga wa meno/mfanya tafiti atafanya uchunguzi wa kinywa kizima kisha atakufahamisha kuhusu afya yako ya kinywa na/ama kukupatia ushauri wa kitaalam na kukuelekeza mahali sahihi pa kupatiwa matibabu.

Usiri

Taarifa zote zitakazokusanywa kupitia maswali yaliyopo kwenye dodoso zitaingizwa kwenye kopyuta kwa kutumia namba za utambulisho. Kutakuwa na usiri na hakuna mtu yeyote ambaye hausiki atakayepata taarifa zilizokusanywa.

Faida

Ushiriki wako katika utafiti huu, utakusaidia katika kupata ushauri wa nini cha kufanya kulingana na matatizo yatakayoonekana baada ya uchunguzi ili kuepusha madhara zaidi ikiwa matatizo hayo hayatahudumiwa. Taarifa utakazotoa zitasaidia katika kufahamu magonjwa ya fizi ikiwemo tatizo la kuvuka fizi, uelewa wa wananchi kuhusu huduma ya magonjwa ya fizi na kujua uhusiano uliopo baina ya tatizo lenyewe na vitu vinavyopelekea/sababu zinazopelekea kuwepo kwa tatizo hili Jijini Dar es Salaam. Matokeo ya utafiti huu yanaweza kuleta ufahamu na uelewa kwa umma kuhusu matatizo ya magonjwa ya fizi ikiwemo tatizo la kuvuka fizi na vitu/sababu zinazopelekea kuwepo kwa tatizo hili na kupunguza ukubwa wa tatizo kwa jamii. Pia yatasaidia watunga sera (wataalam wa mipango) kupanga huduma kufuatana na uhitaji ili kupunguza na hatimaye kuondoa tatizo la uvukaji wa fizi kwa wakazi wa Jiji la Dar es Salaam na Taifa kwa ujumla.

Athari na kukitokea madhara

Hutegemewi kupata madhara yoyote kutokana na kushiriki kwako katika utafiti huu. Hata hivyo baadhi ya maswali yanaweza yasikupendeze, ikiwa hivyo na ikibidi unaweza kukataa kujibu swali lolote la aina hiyo na kujitoa katika utafiti huu.

Uhuru wa kushiriki na haki ya kujitoa

Kushiriki kwako kwenye utafiti huu ni hiari. Unaweza kujitoa kwenye utafiti huu wakati wowote hata kama umeshajaza fomu ya ridhaa ya kushiriki utafiti huu na kujibu baadhi ya maswali. Kukataa kushiriki au kujitoa kwenye utafiti huu hakutaambatana na masharti yoyote, wala kukosa huduma uliyotarajia kuipata.

Nani wa kuwasiliana naye

Kama una maswali/wasiwasi wowote kuhusiana na utafiti huu, wasiliana na mtafiti mkuu, Mjauto Shaaban Mlawa wa Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, S. L. P. 65007, Dar es Salaam, simu ya mkononi +255 714 519 451. Kama una maswali yeyote kuhusu haki/stahili zako kama mshiriki unaweza kuwasiliana na msimamizi mkuu wa utafiti huu Profesa Bakari S. Lembariti, simu ya mkononi: +255 713 223 929 au Profesa M. Aboud, Mwenyekiti wa kamati ya Utafiti na Uchapishaji, Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, S.L.P 65001, Simu ya mezani: +255 22 2150302-6 Dar es Salaam.

Sahihi:

Je, mshiriki amekubali?

Mshiriki amekubali ……..... Mshiriki hajakubali …….

Mimi, ... nimesoma maelezo ya fomu hii.

Maswali yangu yamejibiwa.Nakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki…… Sahihi ya mtafiti/mtafiti msaidizi……

Tarehe ya kutia sahihi ya idhini ya kushiriki…….....……

APPENDIX III: QUESTIONNAIRE (ENGLISH VERSION)

Part 1. Sociodemographic Characteristics

a) Name of dental clinic attended _____

b) Patient ID Number [__][__][__]

c) Date of Birth (Year) [_____]

d) Gender: Male [__] female [__]

e) Education (tick one): No formal education [__] Primary education [__]
Secondary education [__] College/University [__]

2. Do you clean your teeth?

a) Yes b) No

3. What type of tooth cleaning device you use?

a) Plastic tooth brush

b) Chewing stick tooth brush

c) Other, mention_____

4. How many times a day do you clean your teeth?

a) Once a day

b) Twice a day

c) Three times a day

5. What type of method do you use during the tooth brushing?

a) Horizontal technique/stroke

b) Vertical technique/stroke

c) Circular technique/stroke

6. Have you ever been to dental clinic before today?

a) Yes b) No

If the answer is No to qn 6, go to qn no 8.

7. Was it because of gum problem(s)?

a) Yes b) No

8. Have you heard of gum problem(s)?

a) Yes b) No

If the answer is No to qn no 8, go to qn no 13. If Yes, continue with qn no 9.

The source of the information

9. Radio

a) Yes b) No

10. Television

a) Yes b) No

11. Magazines

a) Yes b) No

12. Other (mention) _____

13. Have you ever experienced gum problem(s)?

a) Yes b) No

If the answer is No for qn no 13, go to qn no 19.

Characteristic of the problem was

14. Bleeding

a) Yes b) No

15. Pain

a) Yes b) No

16. Swelling

a) Yes b) No

17. Elongation of tooth/teeth

a) Yes b) No

18. What type of cleaning aid do you use to clean your teeth?

a) Toothpaste

b) Charcoal

c) Ash

d) Other (mention) _____

APPENDIX IV: QUESTIONNAIRE (SWAHILI VERSION)

Part 1. Taarifa ya mgonjwa

a) Jina la kliniki ya meno _____

b) Namba ya mgonjwa [__][__][__]

c) Tarehe ya kuzaliwa (Mwaka) [_____]

d) Jinsia: Mwanaume [__] Mwanamke [__]

e) Elimu (Tiki kimoja): Hajasom [__] Elimu ya msingi [__]
Elimu ya sekondari [__] Elimu ya chuo/chuo kikuu [__]

2. Huwa unasafisha meno?

a) Ndiyo b) Hapana

3. Huwa unatumia aina gani ya mswaki kusafisha meno?

a) Mswaki wa palastiki

b) Mswaki wa mti

c) Aina nyingine ya mswaki, taja _____

4. Huwa unasafisha meno mara ngapi kwa siku?

a) Mara moja

b) Mara mbili

c) Mara tatu

5. Huwa unatumia njia aina gani kusafisha meno?

a) Njia ya kusukuma mswaki mbele na nyuma

b) Njia ya kusukuma mswaki juu na chini

c) Njia ya mduara

6. Uliwahi kwenda kiliniki ya meno kabla kabla ya leo?

a) Ndiyo b) Hapana

Kama jibu lako hapana kwa swali la 6, nenda la 8.

7. Sababu ilikuwa ni matatizo ya fizi?

a) Ndiyo b) Hapana

8. Uliwahi kusikia kuwa kuna matatizo ya fizi?

a) Ndiyo b) Hapana

Kama jibu lako ni hapana kwa swali la 8, nenda la 13

Chanzo cha taarifa ni

9. Radio

a) Ndiyo b) Hapana

10. Luninga

a) Ndiyo b) Hapana

11. Magazeti

a) Ndiyo b) Hapana

12. Chanzo kingine (kitaje) _____

13. Uliwahi kupata matatizo ya fizi?

a) Ndiyo b) Hapana

Kama jibu lako ni hapana kwa swali la 13, nenda la 19

Dalili ya tatizo la fizi ilikuwa ni

14. Fizi kutoa damu

a) Ndiyo b) Hapana

15. Fizi kuuma

a) Ndiyo b) Hapana

16. Fizi kuvimba

a) Ndiyo b) Hapana

17. Jino kuwa refu

a) Ndiyo b) Hapana

18. Huwa unatumia nini katika kusafisha meno?

a) Dawa ya meno

b) Mkaa

c) Majivu

d) Nyingine (itaje) _____

APPENDIX V: CLINICAL EXAMINATION FORM

Name of dental clinic attended _____ Patient ID No [__][__][__]

Tooth No.	PERIODONTAL STATUS																													
	Gingival bleeding (0,1)						Plaque (0,1)						Calculus (0,1)						Gingival recession (in mm)						Periodontal pocket depth (0,1,2)					
	B			L/P			B			L/P			B			L/P			B			L/P			B			L/P		
	D	B	M	D	L	M	D	B	M	D	L	M	D	B	M	D	L	M	D	B	M	D	L	M	D	B	M	D	L	M
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GUIDE FOR SCORING CRITERIA

PERIODONTAL STATUS	CRITERIA	CODING/SCORE
Gingival bleeding	Absent	0
	Present	1
Plaque score	Absent	0
	Present	1
Calculus	Absent	0
	Present	1
Periodontal pocket depth	Not exceeding 3.5mm	0
	Present 3.5-5.5mm	1
	Present >5.5mm	2
Gingival recession	Absent	0
	Present	Measurement in mm